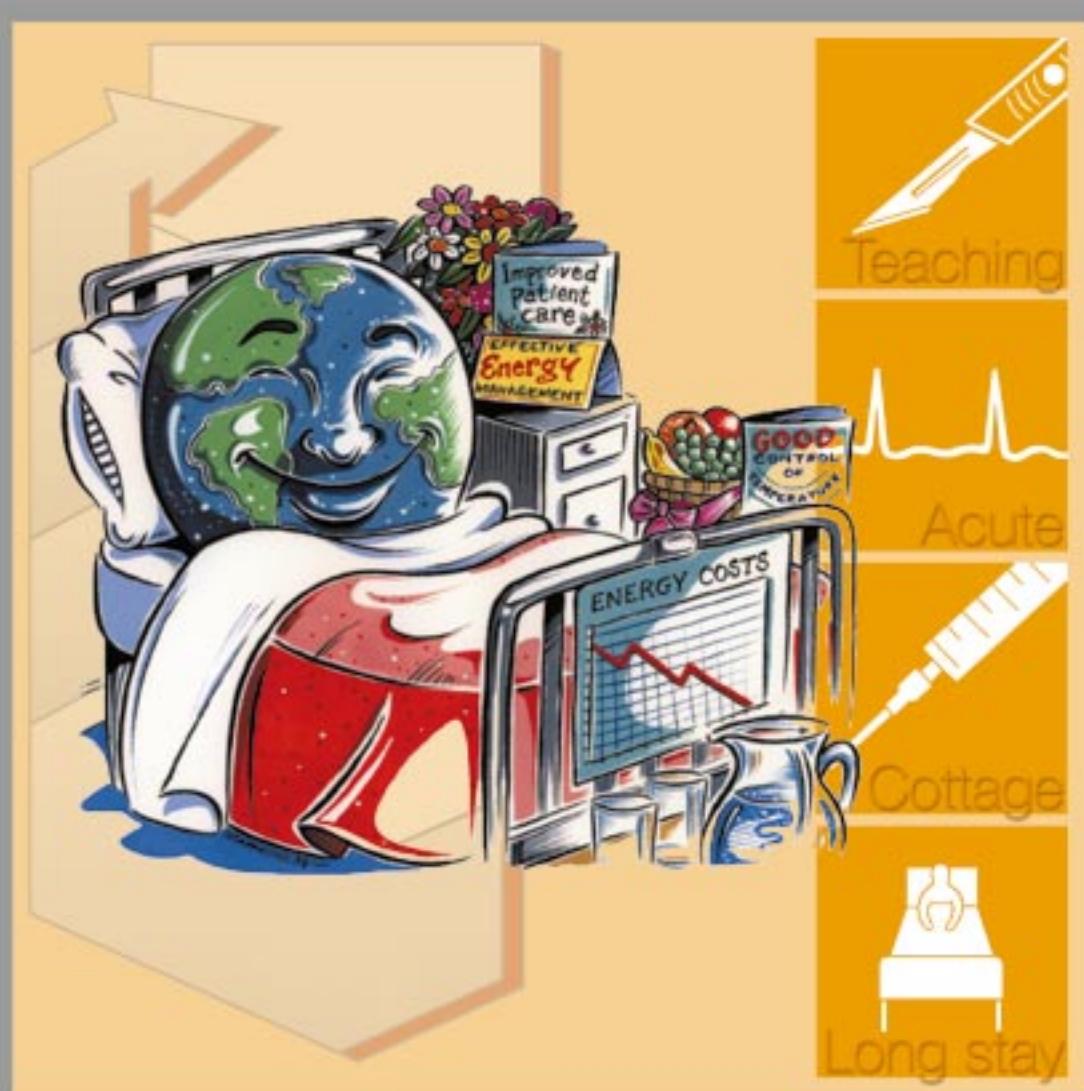


Energy efficiency in hospital – a pathfinder for management and staff



BEST PRACTICE
PROGRAMME

ENERGY EFFICIENCY

ARCHIVED DOCUMENT

INTRODUCTION

The pocket on the inside back cover of this General Information Leaflet contains profiles of NHS Trusts that have already implemented energy-saving measures. By adopting similar initiatives you too could be well on your way to significant energy cost savings.

By using energy more efficiently, NHS Trusts can save money by lower energy bills and reduced Climate Change Levy (CCL) payments. They also reduce the impact of the emissions of gases (principally carbon dioxide (CO_2) – a contributor to climate change) to the atmosphere. Therefore, it makes sense for hospitals to seize on opportunities for reducing energy consumption and costs.

By reducing energy use, NHS Trusts can:

- reduce the impact of the CCL
- use cost savings to benefit patient-focused care plans
- fund further energy-saving measures
- demonstrate commitment to reductions in environmental emissions
- set a good example to the community.

While the use of fossil fuels (natural gas and coal) has declined in the NHS, electricity use is growing significantly each year as a percentage of total energy use. Space heating using electricity generated by conventional power stations results in two-and-a-half times as much CO_2 being released to the atmosphere, compared with the use of natural gas directly. What's more, although electricity accounts for around 20% of the fuels

consumed in the NHS, it represents over 60% of the energy costs. Although there are new technologies to improve energy efficiency, everyone has a role to play in helping Trusts to reduce their energy consumption.

This Leaflet acts as a pointer to relevant help available from the Government's Energy Efficiency Best Practice programme (EEBPP). The publications are available from BRECSU (see contact details on the back cover).

Of particular importance to board members, senior management and estate managers is the five-step strategic approach to energy and environmental management.

Similarly, an energy management matrix provides an 'at-a-glance' view of where improvements can be made (see opposite).

In addition, this Leaflet:

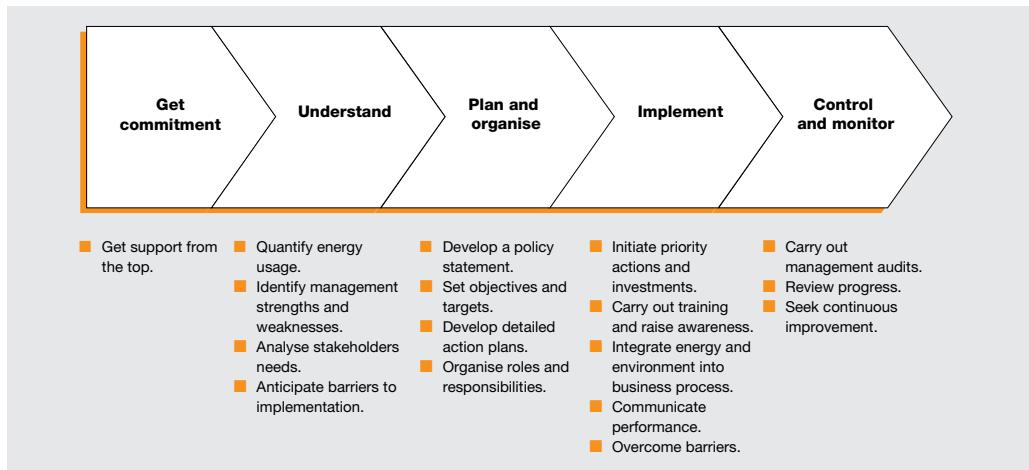
- indicates the roles of staff at all levels in the improvement of energy efficiency
- suggests ways to reduce energy consumption
- outlines energy awareness issues for hospital management and staff.

CLIMATE CHANGE LEVY

The Climate Change Levy (CCL) is a tax on energy use. It is being introduced in April 2001 in order to help the UK meet its legally binding target of a 12.5% reduction in greenhouse gas emissions, and move towards the Government's domestic goal of a 20% reduction in CO_2 emissions. Although the effect of the CCL will vary, NHS Trusts are well positioned to take advantage of energy efficiency initiatives, thus reducing the impact of the Levy. The UK draft Climate Change Programme document can be found at www.environment.detr.gov.uk/climatechange/draft/index.htm

INTRODUCTION

A SYSTEMATIC APPROACH IS NEEDED FOR EFFECTIVE ENERGY AND ENVIRONMENTAL MANAGEMENT



THE MATRIX PROVIDES A SIMPLE PICTURE OF A TRUST'S ENERGY MANAGEMENT STATUS

Level	Energy policy	Organising	Motivation	Information systems	Marketing	Investment
4	Energy policy, action plan and regular review have commitment of top management as part of an environmental strategy	Energy management fully integrated into management structure. Clear delegation of responsibility for energy consumption	Formal and informal channels of communication regularly exploited by energy manager and energy staff at all levels	Comprehensive system sets targets, monitors consumption, identifies faults, quantifies savings and provides budget tracking	Marketing the value of energy efficiency and the performance of energy management both within the organisation and outside it	Positive discrimination in favour of 'green' schemes with detailed investment appraisal of all new-build and refurbishment opportunities
3	Formal energy policy but no active commitment from top management	Energy manager accountable to energy committee representing all users, chaired by a member of the managing board	Energy committee used as main channel together with direct contact with major users	M&T reports for individual premises based on sub-metering, but savings not reported effectively to users	Programme of staff awareness and regular publicity campaigns	Same pay back criteria employed as for all other investment
2	Unadopted energy policy set by energy manager or senior departmental manager	Energy manager in post, reporting to ad-hoc committee, but line management and authority are unclear	Contact with major users through ad-hoc committee chaired by senior departmental manager	Monitoring and targeting reports based on supply meter data. Energy unit has ad-hoc involvement in budget setting	Some ad-hoc staff awareness training	Investment using short term pay back criteria only
1	An unwritten set of guidelines	Energy management the part-time responsibility of someone with only limited authority or influence	Informal contacts between engineer and a few users	Cost reporting based on invoice data. Engineer compiles reports for internal use within technical department	Informal contacts used to promote energy efficiency	Only low cost measures taken
0	No explicit policy	No energy management or any formal delegation of responsibility for energy consumption	No contact with users	No information system. No accounting for energy consumption	No promotion of energy efficiency	No investment in increasing energy efficiency in premises

Legend:

- a well-managed approach to energy and environmental management
- a poorly managed approach, showing where improvements are required

BOARD MEMBERS AND SENIOR MANAGEMENT



THE FIVE-STEP APPROACH 1

Trust board members and senior management have a crucial role in leading a hospital's drive to use energy more efficiently by demonstrating commitment, setting policy and allocating resources. Adopting a strategic approach to energy and environmental management, designed around the five basic steps, provides a good framework (see page 3).

This approach is complementary to *Encode*, the Department of Health guidance on introducing a comprehensive strategy for total energy management in health care establishments (see page 9).

POLICY 2

A written policy communicated to all staff is essential if the strategic approach is to be effective. By formally setting out a policy supported by an action plan, a programme can be arrived at that is specific to an individual hospital or Trust.

ENERGY COST PERFORMANCE INDICATOR (ECI) 3

Understanding the existing situation is essential if plans are to be set effectively and resources allocated to priority areas. As a first step, a useful indicator of whether or not a hospital is spending too much on energy is a direct comparison with the energy cost per £million of a Trust's overall operating expenditure. ECIs have been calculated for 'typical' and 'good practice' performing hospitals, and form a good basis for discussing with the energy manager how energy performance could be improved.

MANAGEMENT MATRIX 4

For any approach to be effective it is important to understand management strengths and weaknesses. This is where the energy matrix illustrated on page 3 is helpful. The matrix gives a simple picture of a Trust's energy management status and indicates the areas where improvement should be directed. By regularly reviewing the hospital's approach to energy and environmental issues, senior management can see how the Trust's control of energy is changing.

BOARD MEMBERS AND SENIOR MANAGEMENT

ENERGY SERVICES 5

As an alternative to using in-house resources, an energy services contract can be a cost-effective approach. The contractor provides energy for the hospital, and may be responsible for procuring new plant (such as CHP) and making energy efficiency improvements.

COMBINED HEAT AND POWER

Increasingly, hospitals are exploring new ways of reducing energy costs by more efficient production of energy through new technologies such as combined heat and power (CHP). CHP is a technology that generates both heat and electrical energy. Furthermore, CHP can be an income-generating mechanism suitable for most NHS Trusts, permitting excess electricity production to be sold-off to the grid. A well-designed CHP installation may be exempt from the CCL, so CHP should be evaluated by Trusts as a matter of priority.

ENERGY EFFICIENCY BEST PRACTICE**PROGRAMME PUBLICATIONS****Key publications**

- 1 GPG 200 A strategic approach to energy and environmental management
- 2 GPG 186 Developing an effective energy policy
- 3 GIL 51 An energy cost performance indicator – for chief executives and other senior managers in NHS Trusts
- 4 GPG 119 Organising energy management – a corporate approach
- 5 GPG 289 Getting signed up – contract energy services in the public sector

Other reading

- GPG 118 Managing energy use. Minimising running costs of office equipment and related air-conditioning
- GPG 276 Managing for a better environment. Minimising running costs and impact of office equipment
- GPG 231 Introducing information systems for energy management
- GPG 267 Combined heat and power in hospitals



MIDDLE MANAGERS AND STAFF



ENERGY WASTAGE AWARENESS 1 2

All staff use energy to a greater or lesser extent in carrying out their duties. Accordingly, they are ideally placed to know where and when energy is being wasted. Making them aware of energy-related issues and giving them responsibility for their actions gives useful savings at little or no cost.

Energy awareness is concerned with:

- cutting energy and water costs through good housekeeping
- using resources more efficiently
- co-operating with other departments to make energy savings.

Good housekeeping consists of some good common-sense actions, which can be quickly adopted by all hospital staff. These include:

- switching equipment off when not required
- reporting energy wastage and dripping taps
- considering the energy implications when purchasing goods and materials.

ENERGY CHECKLIST 3

Managers may find it helpful to use a simple energy checklist to discover how 'healthy' their department or area may be. The one shown in Good Practice Guide (GPG) 261 and illustrated opposite is a good place to start as it will produce immediate savings.

ENERGY AWARENESS CAMPAIGN 4 5

An energy awareness campaign can achieve significant energy cost savings by involving staff and winning over their co-operation. Managers can start a campaign at local level, perhaps by involving the estates department (see page 8). The campaign may include posters and competitions, with prizes being offered for the best energy-saving suggestions. Think about it! It makes sense and could lead to a Trust-wide campaign.

An energy awareness campaign will soon reveal the locations, correct settings and status of controls; showing which controls are altered by staff and determine what should be left to the estates department. It will also highlight those controls that directly impact on patient care, in particular the heating of wards.

MIDDLE MANAGERS AND STAFF

SAMPLE CHECKLIST

Lighting

- Switch off unnecessary lighting, as lighting accounts for 50% of a hospital's electricity costs.
- Use natural daylighting when levels are satisfactory.
- Don't draw blinds to block out the sun if it means switching on the lights.
- Minimise the amount of lighting in use for night staff.
- Arrange a schedule for cleaning windows.

Office equipment

- Switch off equipment when not required.
- Enable standby facilities where provided and use realistic settings.
- Buy energy-efficient equipment.

Heating and hot water

- Heat only those areas that require heating.
- Avoid opening windows to remove excess heat.
- Stored hot water should comply with the regulations set out in CIBSE Technical Memorandum 13 (TM13) to avoid legionella.

Controls

- Reducing a room thermostat by 1°C reduces the heating costs for the affected room or area by 10%.
- Set thermostatic radiator valves (TRVs) to a realistic setting.

Dispelling the myths

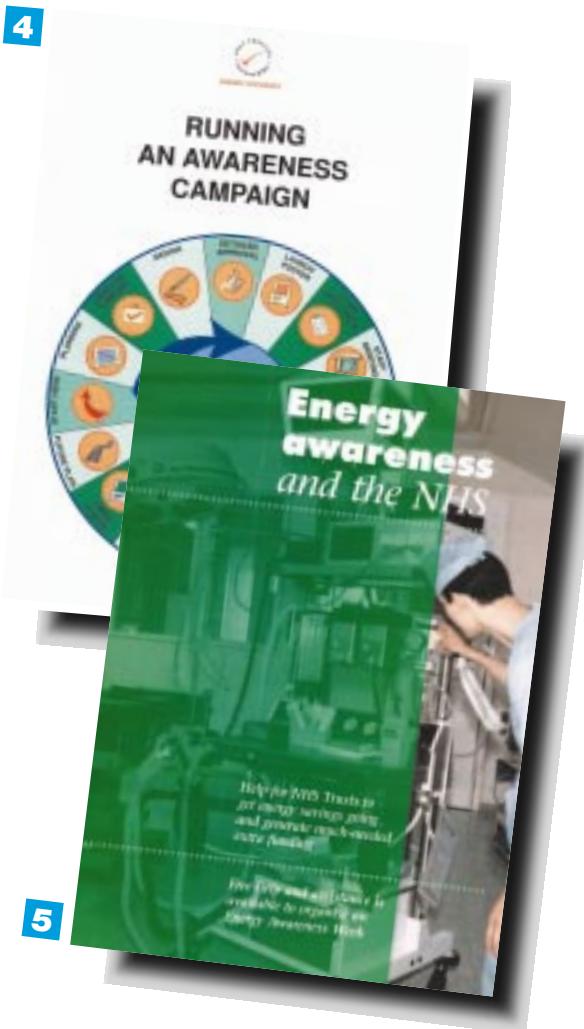
- It is always cheaper to switch off fluorescent lighting even when a room or area is unoccupied for just a few minutes.
- Computer screensavers do not reduce energy consumption.



ENERGY EFFICIENCY BEST PRACTICE
PROGRAMME PUBLICATIONS

Key publications

- 1 GPG 172 Marketing energy efficiency – raising staff awareness
- 2 Hospital posters
- 3 GPG 261 Reducing energy waste in the NHS – a good housekeeping guide for managers
- 4 Running an awareness campaign pack
- 5 Energy awareness and the NHS flyer



ESTATES AND ENERGY MANAGERS



Estates and energy managers have a key role to play in influencing the pattern of a hospital's energy consumption. They have the technical expertise and knowledge to implement many of the actions recommended in *Encode* (see the box opposite) and are ideally placed to monitor the effectiveness of any energy efficiency measures.

They can also provide guidance on complementary actions to improve energy efficiency, including:

- energy-use data for the whole hospital and for individual departments
- advice on energy use
- advice on efficient technologies
- staff training in energy awareness
- identification of opportunities prior to replacing plant and equipment
- help with refurbishment
- recommendations for manually operated heating and lighting controls and the correct operation by staff.

ENERGY USE DATA 1 2

Estates and energy managers can provide information on energy consumption throughout the hospital. Energy consumption data can help identify opportunities for evaluating new fuels and tariffs. By regularly checking energy performance against published benchmarks it will soon become apparent how the hospital is performing and pinpoint where improvements are needed. Many of the improvements are likely to be self-funding from resultant energy cost savings.

ESTATES AND ENERGY MANAGERS

ENCODE

Encode is the Department of Health guidance on introducing a comprehensive strategy for total energy management in health care establishments. Published as a set of three documents and supported by a number of computer programs, Encode complements the information published under the EEBPs. Encode emphasises the importance of monitoring, energy audits, setting targets, assessing the economic and strategic viability of potential energy-saving measures, options appraisals, and ranking proposed measures to provide a basis for sound energy management planning.

Encode incorporates an Energy Survey and Audit Method (ESAM) to assess the effectiveness of energy use and identify measures to reduce consumption and cost.

Encode is available from The Stationery Office.

ADVICE ON ENERGY USE 3 4 5

Energy managers have a hospital-wide remit to provide advice to Board management and individual departments on the efficient use of energy. Energy managers can also advise staff who use PCs and other office equipment of any in-built energy-saving facilities, such as standby or low-power options, and encourage staff to use the facilities where equipment is not in constant use.

ENERGY-EFFICIENT TECHNOLOGIES**Office equipment 3 4**

When purchasing new office equipment, remember that Energy Star compliant equipment achieves lower energy use on standby than conventional equipment. Energy Star equipment will still use energy at night, unless switched off. Staff will need reminding of the correct operating regime.



ESTATES AND ENERGY MANAGERS

**Combined heat and power (CHP) 6 7**

A hospital is an ideal environment for CHP because it has a constant high demand for heat – a prerequisite for adopting CHP and the parameter against which the CHP installation is sized. EEBP sizing software is available from BRECSU to assist in evaluating CHP for new and existing buildings.

Lighting 8

When replacing lamps, the use of energy-efficient alternatives should be investigated. There are now energy-efficient direct replacements for 'energy-expensive' tungsten lamps and more efficient replacements for some older-type fluorescent lighting. By 'zoning' lighting systems efficiently, more logical switching arrangements can be achieved. However, the cheapest source of lighting is natural daylight, and this should be encouraged wherever and whenever possible. There are also energy-efficient alternatives for external lighting and these should be installed with appropriate controls (see 'Controls' below).

Controls 9 11

Building energy management systems (BEMSSs) optimise the use of boiler and heating plant. TRVs fitted to radiators add to patient comfort by preventing overheating of wards. In office areas, automatic lighting controls reduce lighting levels when daylighting is sufficient and can switch off lighting at the end of the normal working day (with manual override for cleaners and maintenance staff).

ESTATES AND ENERGY MANAGERS

The introduction and proper use of controls and automatic switching reduces costs. Sensors in car parks or general pedestrian areas may be a preferable and energy-efficient option to control lighting, and presence detectors in toilets save water. In fact, many of the controls that could be installed in hospitals can be funded from energy cost saving initiatives.

STAFF TRAINING IN ENERGY AWARENESS 10

Estates and energy managers know 'what does what' and the impact of 'doing this or that'. Their contribution is essential if staff training in energy awareness is to impact on energy efficiency. Energy managers should be involved in energy 'walkrounds' of departments. They can quickly spot opportunities for energy savings and can brief staff on how to be more energy efficient.

They can also advise staff on the results of altering controls and adjusting thermostats. In particular, they will know whether or not patient comfort is affected.

IDENTIFICATION OF OPPORTUNITIES WHEN REPLACING PLANT AND EQUIPMENT**1 3 4 6 7**

Estates can provide energy information about new medical or office equipment and should always be consulted before any energy-intensive equipment is purchased; they can estimate its impact on the hospital's electrical systems and energy costs. They can also advise on the introduction of energy-efficient technologies, such as CHP, shown opposite.



ESTATES AND ENERGY MANAGERS

HELP WITH IMPROVEMENTS DURING REFURBISHMENT **11**

Refurbishment offers a good opportunity for introducing energy efficiency measures, many of which have a relatively short payback period, eg plant insulation and automatic controls. This is also a good time to introduce more energy-efficient lighting with appropriate controls (see page 10).

RECOMMENDATIONS FOR MANUALLY OPERATED CONTROLS **9**

Energy managers should brief staff on manually operated controls, together with advice on the correct settings. In addition, estates and energy managers should identify the energy-saving opportunities afforded by installing manually operated controls, for example, switches, thermostats and, where feasible, dimmers.

Provided that electrical appliances, equipment, systems and circuits are 'switched-off' immediately when the demand ceases, manually operated controls are the most energy efficient.

COMMUNICATING WITH SENIOR MANAGEMENT **12 13**

Estates and energy managers have a responsibility to communicate ideas and submit proposals on energy saving to senior management. The EEBP can provide help in communicating effectively with senior management. These publications are designed to help improve the effectiveness of energy proposals, and in getting them considered on an equal basis with other projects being considered by Trust management.

ESTATES AND ENERGY MANAGERS


**ENERGY EFFICIENCY BEST PRACTICE
PROGRAMME PUBLICATIONS**
Key publications

- 1** ECON 72 Energy consumption in hospitals
- 2** GIR 47 Controlling energy use in buildings
- 3** GPG 118 Managing energy use. Minimising running costs of office equipment and related air-conditioning
- 4** GPG 276 Managing for a better environment. Minimising the running costs and impact of office equipment
- 5** GPG 52 Good housekeeping in the NHS. A guide for energy and estate managers
- 6** CHP-SIZER. A tool to conduct a preliminary evaluation of CHP for new hospitals and hotels
- 7** GPG 267 Combined heat and power in hospitals
- 8** GPG 272 Lighting for people, energy efficiency and architecture – an overview of lighting requirements and design
- 9** GPG 160 Electric lighting controls – a guide for designers, installers and users
- 10** Running an awareness campaign pack
- 11** GPG 206 Energy efficient refurbishment of hospitals
- 12** GPG 167 Organisational aspects of energy management: a self-assessment manual for managers
- 13** GPG 165 Financial aspects of energy management in buildings


**ENERGY EFFICIENCY BEST PRACTICE
PROGRAMME PUBLICATIONS**
Other reading

- GIR 40 Heating systems and their control
- GIR 41 Variable flow control
- FEB 7 Degree days
- GPG 54 Electricity savings in hospitals. A guide for energy and estate managers
- GPG 222 Reduced catering costs through energy efficiency. A guide for kitchen designers, contract caterers and operators
- GPG 234 Guide to community heating and CHP. Commercial, public and domestic applications

FURTHER SOURCES OF HELP

CHARTERED INSTITUTION OF BUILDING SERVICES ENGINEERS (CIBSE)

CIBSE is a recognised professional institution for those engaged in the building services industry. The Institution publishes a wealth of information on most technical aspects of building services, including energy efficiency and lighting. CIBSE also holds a register of approved consultants, including lighting experts.

Delta House, 222 Balham High Road, Balham
London SW12 9BS. Tel 020 8675 5211
Fax 020 8675 5449. Website www.cibse.org

COMBINED HEAT AND POWER ASSOCIATION (CHPA)

The CHPA has information on the latest developments in the industry, technology and the political environment, including financial support for feasibility studies and capital grants.

Grosvenor Gardens House, 35/37 Grosvenor
Gardens, London SW1W 0BS. Tel 020 7828 4077
Fax 020 7828 0310. Website www.chpa.co.uk

ELECTRICAL CONTRACTORS ASSOCIATION (ECA)

The ECA has a register of over 2000 approved electrical contractors and publishes guidelines on good practice within the industry.

ESCA House, 34 Palace Court, London W2 4HY
Tel 020 7313 4800. Fax 020 7221 7344
Website www.eca.co.uk

ENERGY SYSTEMS TRADE ASSOCIATION (ESTA)

Contact ESTA for a register of energy services and contractors.

PO Box 77, Benfleet, Essex SS7 5EX
Tel 07041 492049. Fax 07041 492050
Website www.estat.org.uk

INSTITUTE OF HEALTHCARE ENGINEERING AND ESTATE MANAGEMENT (IHEEM)

IHEEM represents estates managers employed in NHS and private hospitals, in consultancies working in the health care field, and in industry (manufacturing or contracting) for health care. Among other services, the Institute helps to keep estates managers abreast of changes in technology and statutory regulations.

2 Abingdon House, Cumberland Business Centre
Northumberland Road, Portsmouth PO5 9DS
Tel 0203 9282 316. Fax 0203 9281 5927
Website www.iheem.org.uk

INSTITUTE OF LIGHTING ENGINEERS (ILE)

For information on registered lighting engineers.

Lennox House, 9 Lawford Road, Rugby
Warwickshire CV21 2DT
Tel 01788 576492. Fax 01788 540145
Website www.ile.co.uk

LIGHTING INDUSTRY FEDERATION (LIF)

For information on any aspect of lighting installations and, in particular, details of energy-efficient lamps and luminaire options.

207 Balham High Road, Balham
London SW17 7BQ. Tel 020 8675 5432
Fax 020 8673 5880. Website www.lif.co.uk

WHERE TO GET HELP

ENERGY EFFICIENCY BEST PRACTICE PROGRAMME

The EEBP is a UK Government initiative designed to help organisations improve the efficiency with which they use energy. It provides independent, authoritative advice and assistance to UK private and public sector organisations. The programme is managed by BRECSU and ETSU (contact details are given below).

Information and guidance on good practice is disseminated via publications, videos and seminars, most of which are available free on request.

**DESIGN ADVICE**

Design Advice is a Government-sponsored initiative that offers design teams and their clients independent and objective advice on all aspects of energy-efficient and environmentally conscious design. Subject to a simple eligibility criterion, a one-day consultation is available, paid for by a cash-back scheme. It will be undertaken by a consultant registered with the service, who will provide a brief written report detailing design recommendations. Tel 01923 664258. Internet www.bre.co.uk/designadvice

**ENVIRONMENT AND ENERGY HELPLINE**

To obtain further advice and information telephone the Government's Environmental and Energy Helpline on 0800 585794.

This Leaflet is based on material drafted by BREcom for the Energy Efficiency Best Practice programme.

The Government's Energy Efficiency Best Practice programme provides impartial, authoritative information on energy efficiency techniques and technologies in industry and buildings. This information is disseminated through publications, videos and software, together with seminars, workshops and other events. Publications within the Best Practice programme are shown opposite.

Visit the website at www.energy-efficiency.gov.uk

For further information on:

Buildings-related projects contact:
Enquiries Bureau

BRECSU

BRE
Garston, Watford WD25 9XX
Tel 01923 664258
Fax 01923 664787
E-mail brecsuenq@bre.co.uk

Industrial projects contact:
Energy Efficiency Enquiries Bureau

ETSU

Harwell, Oxfordshire
OX11 0RA
Tel 01235 436747
Fax 01235 433066
E-mail etsuenq@aeat.co.uk

Energy Consumption Guides: compare energy use in specific processes, operations, plant and building types.

Good Practice: promotes proven energy-efficient techniques through Guides and Case Studies.

New Practice: monitors first commercial applications of new energy efficiency measures.

Future Practice: reports on joint R&D ventures into new energy efficiency measures.

General Information: describes concepts and approaches yet to be fully established as good practice.

Fuel Efficiency Booklets: give detailed information on specific technologies and techniques.

Introduction to Energy Efficiency: helps new energy managers understand the use and costs of heating, lighting, etc.